IM SERIES

CHINO Works America Inc.
Instrumentation, Control and Systems

APP-002

Animal Food Products





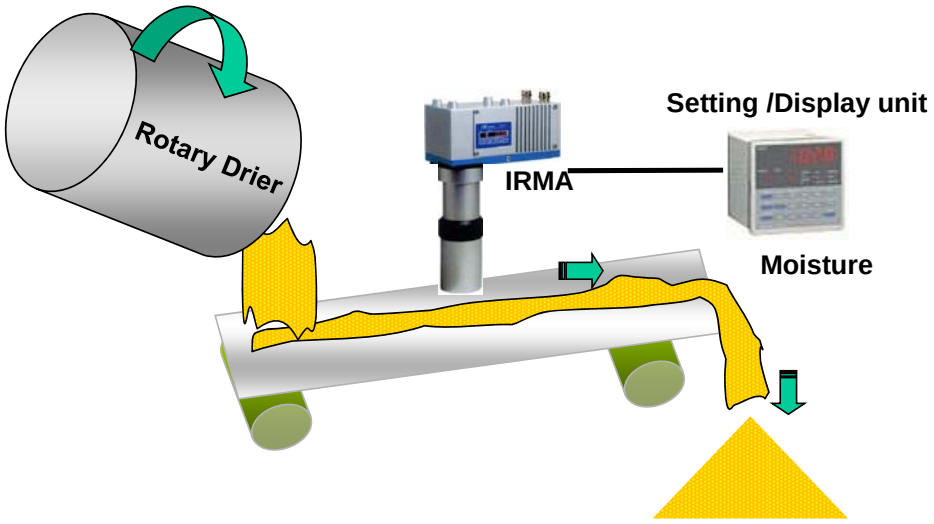
Application notes

Merenje vlažnosti za DDG

During the distillation process of ethanol from crops such as corn, sorghum, or barley, DDG, Dried Distiller's Grains, are produced as cereal byproduct. These DDG have been used mainly as animal feed, pet food, or fishing bait. Recently, DDG are occasionally used for mulch farming to suppress weed growth.

It is crucial to control moisture of DDG while they are produced. These days, DDG are produced under the better combustion rate to reduce burning time; or DDG need to be prevented from growing mold or damaged by excessive moisture while they are stored. CHINO's IM series measures the moisture from 5% to 30%(±0.5% accuracy) after dried process of DDG, and also maintain product quality as well as cut costs of production.

IM Series is equipped w/ 4-20mA Analog output which can be easily incorporated with existing process control systems.



IM SERIES

APP-027

Human Food Products

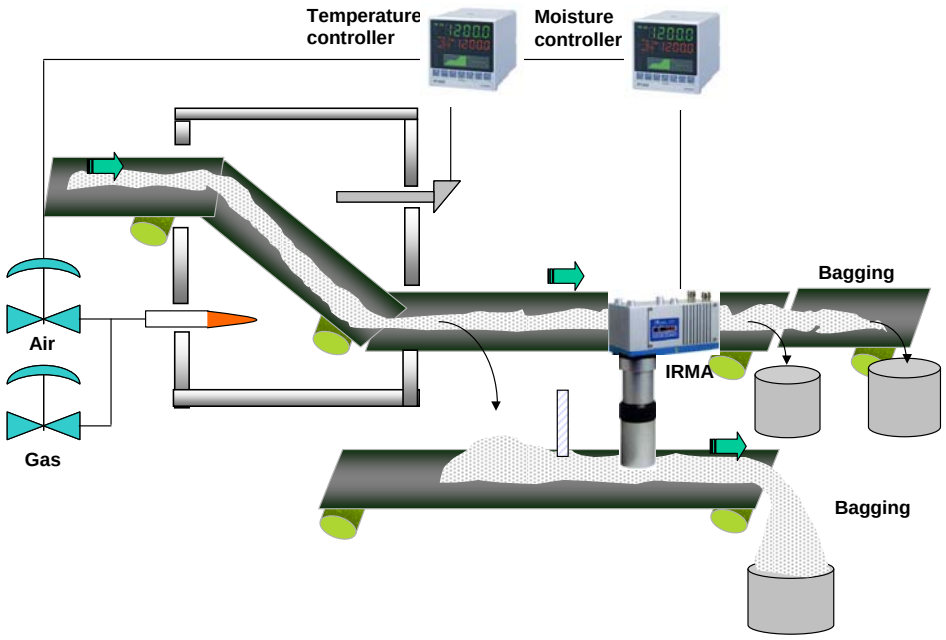
Application notes

Vlažnost u pšeničnom brašnu / mleku u prahu

Wheat flour requires to be observed under a subtle and accurate moisture control, because powdery wheat flour is easy to be transformed into a sticky dough with excess moisture.

CHINO's IM series can measure from 5 to 15% moisture(±0.2% accuracy) in the flour during the last process before packed into bags. It can maintain a steady quality of the flour and also cut production cost of its drying process. And to prevent flour from over-dried, IM series can apply cascade control, a combination of feedback system. The signals from moisture gauge can be used to control temperature of the drier.
Flour has high reflecting characteristic on any particular Infrared wavelength. Because of this reason, the Fiber type IM Series can be applied to the system.

IM Series is equipped w/ 4-20mA Analog output which can be easily incorporated with existing process control systems.



IM SERIES

APP-049

Minerals

Application notes

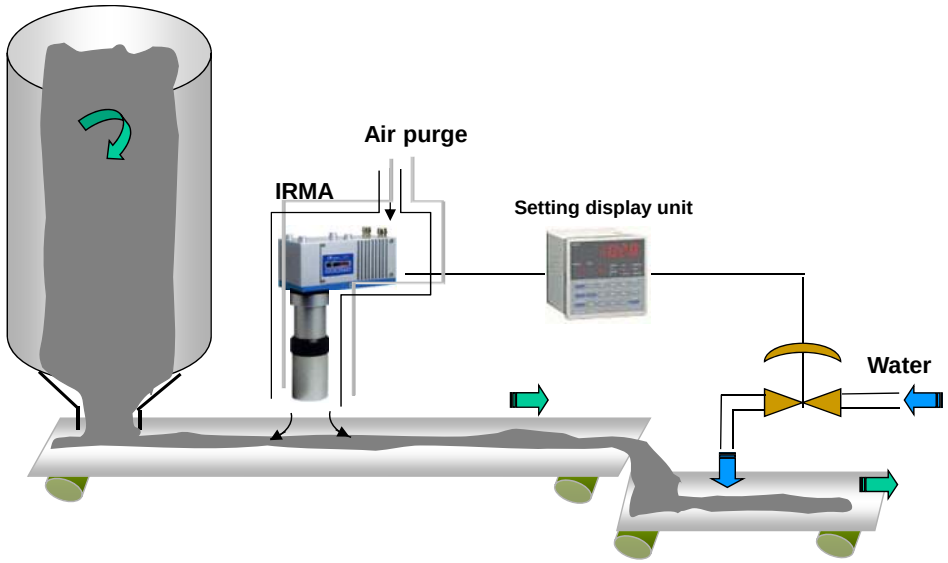
Merenje vlažnosti pepela peći za spaljivanje

Incinerator ash needs extensive moisture control; ash would be scattered around with very low moisture, while excess moisture would cost more(to transport).

CHINO's IM series can measure the moisture of the ash placed on the running conveyor belt quickly and without touching the material. As the results, the amount of water mixed into the ash after the burning process can be controlled properly and easily.

Because there is dust around the installation area, IRMA should be kept inside an insulated cooling box, with air purged. Usually the moisture of incinerator ash can be measured within 0 to 30 %(±0.5% accuracy).

IM Series is equipped w/ 4-20mA Analog output which can be easily incorporated with existing process control systems.



Moisture Measurement for Incinerator Ash APP-049

Products / Location	Parameter	Range
Incinerator Ash	Moisture	0 to 30%

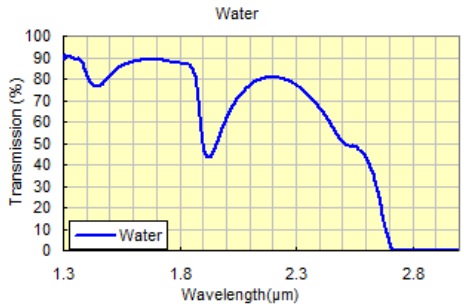
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

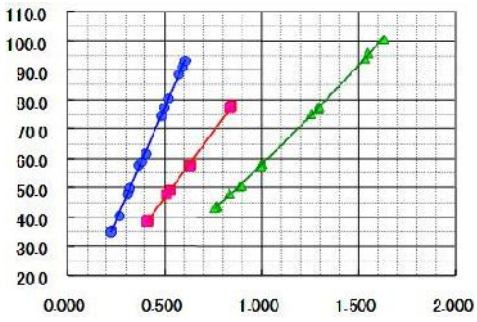
Install at 90° to measure. Strongly recommend to use air purge AND insulated cooling box to prevent lenses from dusty ash. Some samples are dark in color and not in good condition to reflect well. To get better results, place a sample in a stable condition, such as measured on leveled surface, and with proper distance; eliminating external lights, or preventing from dust, as possible.Also, it is highly recommended to run zero calibration by simply using IR-WEB every 3 months.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



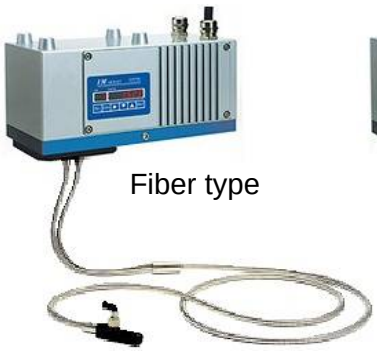
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-094

Chemicals

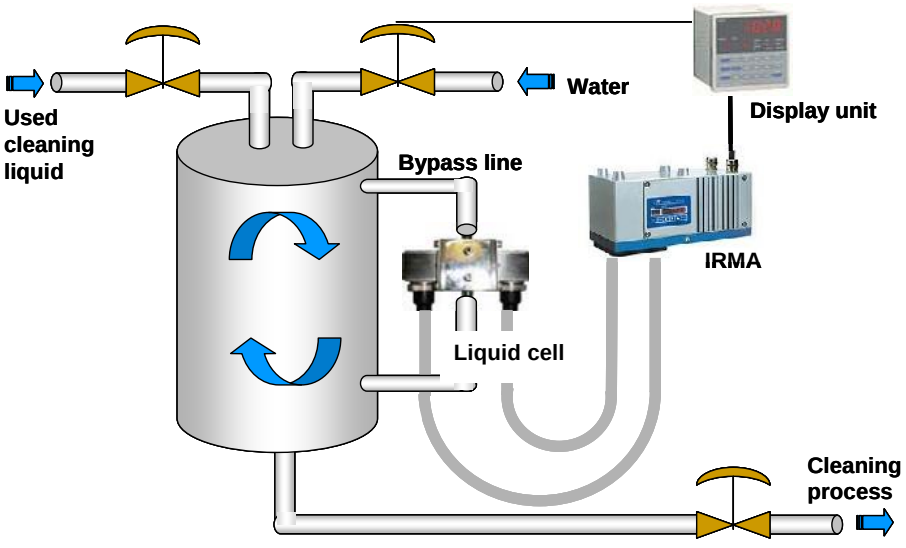
Application notes

Vlažnost u rastvorima za čišćenje

Instead of using Chlorofluorocarbon, alcohol solution is used for cleaning PCB (printed circuit board), LC(liquid crystal), or solar panel. This solusion tend to start fire at low moisture. While excess moisture reduces cleaning ability of the solution. Therefore, moisture control is essential for these solutions.

In most cases, these solutions are reused, and moisture gauge is set along in the process of collecting solution and adding water to it. The gauge can measure 5-15% moisture(±0.2% accuracy), but electronic devices are not allowed to install in-line, because of fire safety. Liquid Cell and Optical Fiber Cable(2m+ in length) from CHINO IM series can control moisture safely and easily from inside the control room. Optical fiber is made of glass, and contains no materials that carry electronic current. Using optical fiber can be a perfect electric insulator to isolate the measuring area.

IM Series is equipped w/ 4-20mA Analog output which can be easily incorporated with existing process control systems.



Moisture in cleaning solution

APP-094

Products / Location	Parameter	Range
Cleaning solution	Moisture	5 to 10%

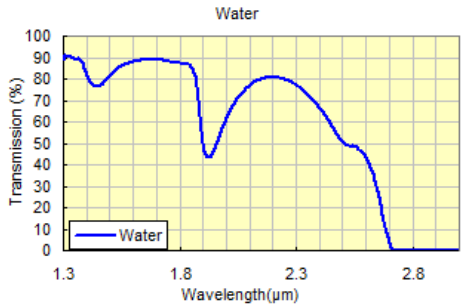
Recommended model / Item

* Liquid cell type misture unit
  Model : IRMA2100S Qty : 1
* liquid cell (2mm gap)
  Model : IR-WCC5201 Qty : 1
* Fiber optic cable (5m)
  Model : IR-Fiber005 Qty : 2

Installation

Install Chino's liquid cell on a bypass-line from used cleaning solution line, and after adding-water process. (Usually the cell needs to be cleaned-up every 3 months, so it is necessary to put a valve on both inlet and outlet of the cell for the removing purpose)
By connecting CHINO's cell and IM series with fiber optic cables, the measuring area can be electricaly insulated.

Absorption characteristic



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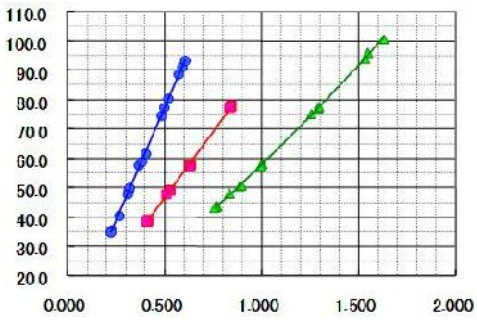
Calibration curve



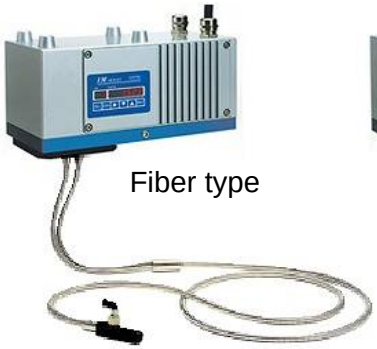
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-037

Human Food Products





Application notes

Merenje vlažnosti / Proizvodnja šećera

The sugar industry processes sugar cane and sugar beet to manufacture edible sugar. Typical processes are as follows;

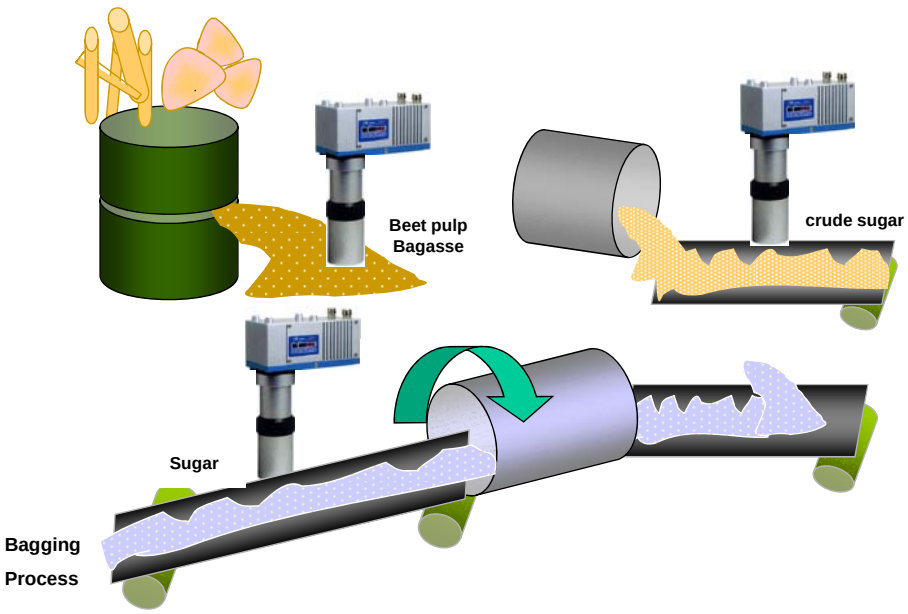
1. Washing/Preparation/Extraction
   Sugar cane: Milling with water, extracting raw juice -> purification
   Sugar beet: Diffusing with hot water, extracting raw juice -> purification.
2. Purification -> Refinery
   Crystallized sugar after purification is called "raw sugar". Raw sugar is then dried and may be further refined before bagging for shipment.

CHINO's IM Series online system can measure moisture to maintain product consistency as well as energy efficiency at the following parts of the sugar manufacturing process.

A. Moisture measurement of "Bagasse" - fiber residue of the canes.
   10% - 40% (Accuracy: +/- 0.5%) Bagasse is mainly used as a biofuel, renewable resource in the pulp, paper products and building materials.

B. Moisture measurement of "used cossettes" - sliced beets used for diffusion. 30% - 70% (Accuracy: +/- 0.5%)
   Used cossettes are dried and sold as animal feed

C. Moisture control of raw sugar and during refinery
   IM Series is equipped w/ 4-20mA Analog output which can be easily incorporated with existing process control systems.



Moisture measurement / Sugar production APP-037

Products / Location	Parameter	Range
Bagasse	Moisture	10 to 40%
Used Cossettes (beet pulp)	Moisture	30 to 70%
Raw sugar	Moisture	0 to 2%
Refined sugar	Moisture	0 to 2%

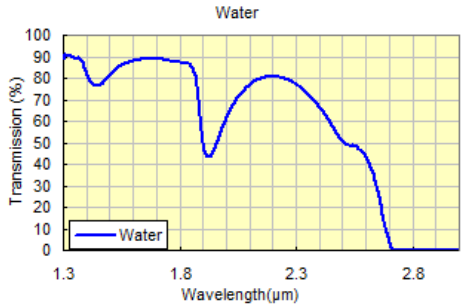
Recommended model / Item

A. Moisture over 50% - High moisture unit and associated accessories
Model: IRMA1200S, IR-WEA, IR-WEB
B. Up to 50% - General moisture unit and associated accessories
Model: IRMA1100S, IR-WEA, IR-WEB

Installation

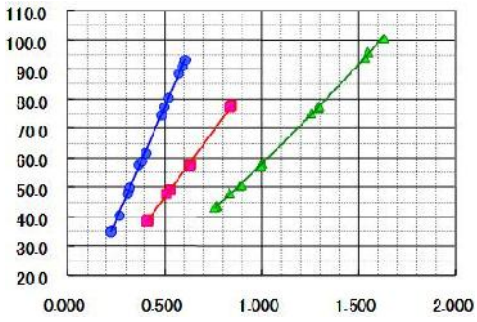
Mount IRMA to make the light beam falls onto the target perpendicularly. If dust or fine particle is presence, implement air purging with filtered instrument air. It is recommended to choose locations where the distance between the unit's lens and the target is stable. Use plow as necessary to level the height of the product that goes under the IRMA. It may require to use different calibration curve depending on products.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



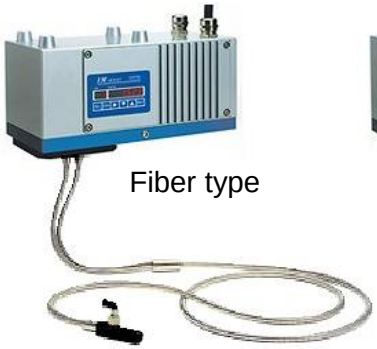
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-009

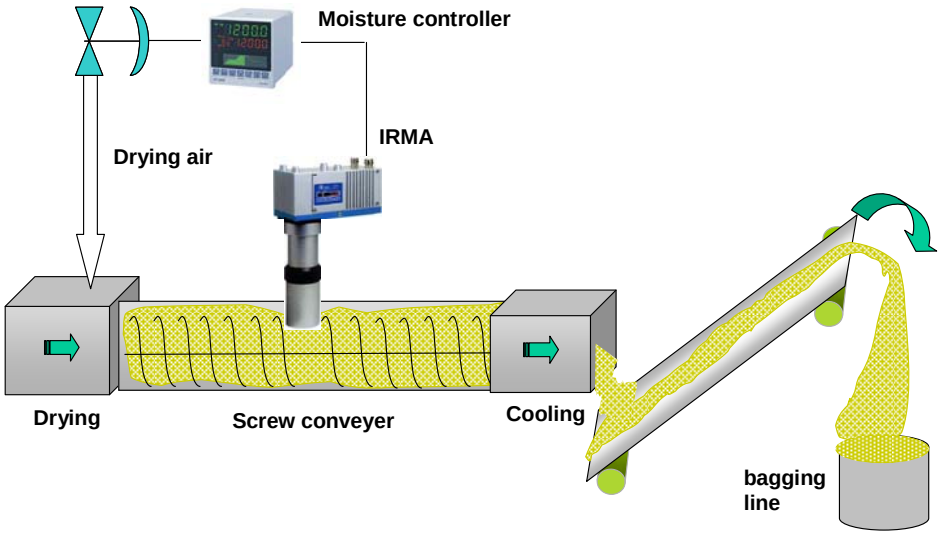
Animal Food Products

Application notes

Vlažna hrana za kućne ljubimce/ Zaliha hrane

Moisture control for Pet Food is and has been in important roll in the Pet Food and Feed Stock Industries. It controls;
1. Product hardness, palatability, consistency in size and taste,
2. Weight of product, shelf life, and
3. Process efficiency.

CHINO IRMA Series high speed and non-contact measurement system can measure product's moisture content of 15 to 30%, accuracy within +/-0.4% and be utilized to improve product quality as well as manufacturing process efficiency.
CHINO IRMA Series can be used at various stages of the manufacturing process. Specifically determined calibration curve can be used for products that may be in different form, color and temperature from stage to stage and from product to product.
CHINO IRMA Series can be used as stand alone or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Wet Pet Food / Feed Stock APP-009

Products / Location	Parameter	Range
Semi-moist pet food	Moisture	25 to 35%
Fish meal (animal feed)	Moisture	15 to 40%
Wet canned dog food	Moisture	60 to 90%

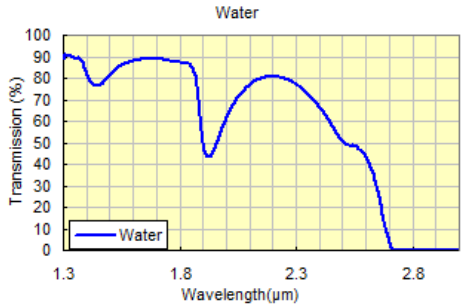
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

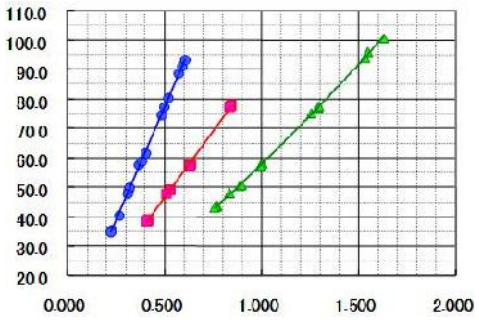
Mount IRMA to make the light beam falls onto the target perpendicularly. Choose locations not to have blades of the screw coming into the spot of measurement. It is recommended to choose locations where the distance between the unit's lens and the target is stable. In case of steam or dust being presence, air purging with filtered instrument air will eliminate any steam or dust coming into the beam path. It is also recommended to conduct periodical "Zero-Calibration".

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



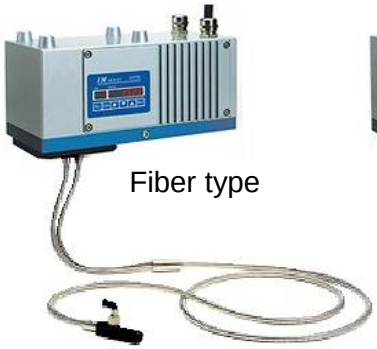
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-006

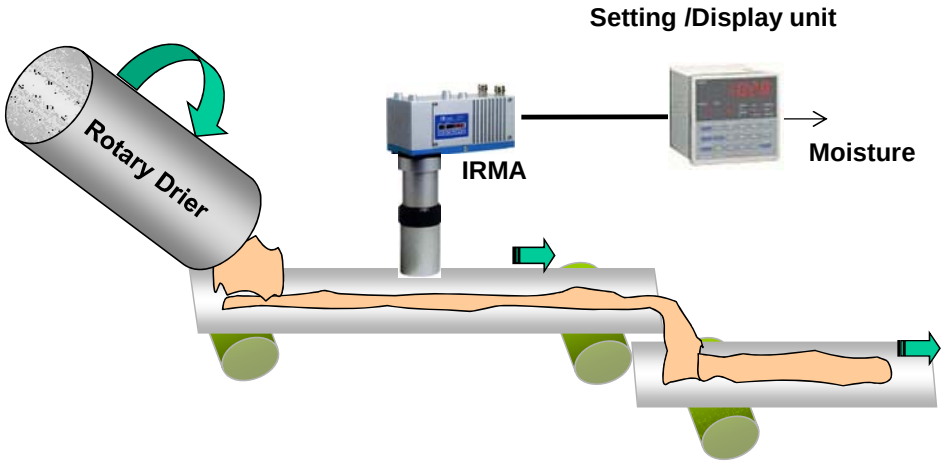
Animai Food Products

Application notes

Suva hrana za kućne ljubimce/ Vlažnost zaliha hrane

Moisture control for Pet Food is and has been in important roll in the Pet Food and Feed Stock Industries. It controls;
1. Product hardness, palatability, consistency in size and taste,
2. Weight of product, shelf life, and
3. Process efficiency.

CHINO IRMA Series high speed and non-contact measurement system can measure product's moisture content of 5 to 15%, accuracy within +/-0.2% and be utilized to improve product quality as well as manufacturing process efficiency.
CHINO IRMA Series can be used at various stages of the manufacturing process. Specifically determined calibration curve can be used for products that may be in different form, color and temperature from stage to stage and from product to product.
CHINO IRMA Series can be used as stand alone or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Dry Pet Food / Feed Stock Moisture APP-006

Products / Location	Parameter	Range
Dry pet Food	Moisture	4 to 12%
Feed stock	Moisture	8 to 14%

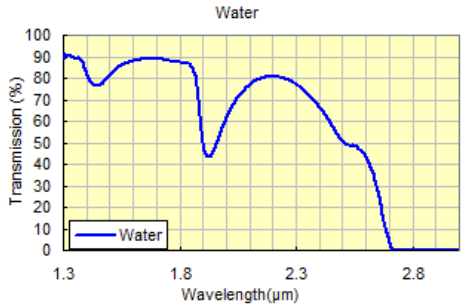
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

The best installation can be over a conveyer that carries product continuously. CHINO IRMA should be installed so the beam path can be perpendicular against the pass way. In case of steam or dust being presence, air purging with filtered instrument air will eliminate any steam or dust coming into the beam path. In case that the height of the flow excessively varies, a leveling plate may need to be installed to level the height in order to stabilize the measurement.

Absorption characteristic



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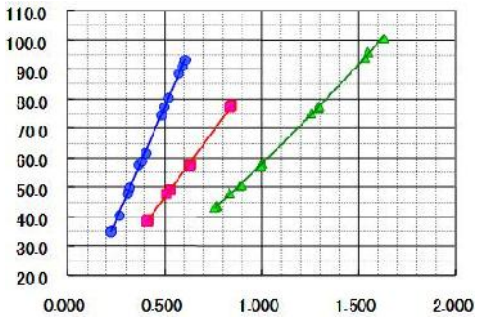
Calibration curve



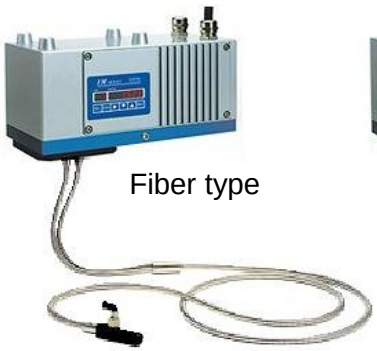
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

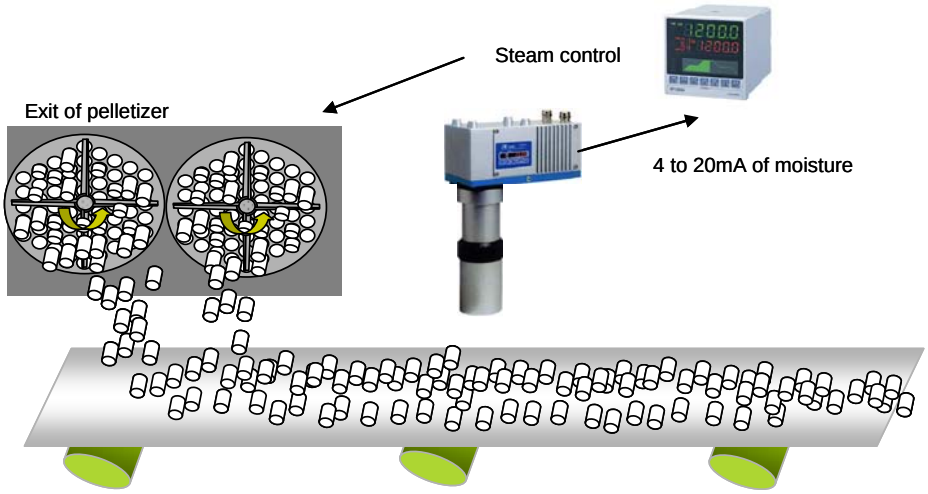
APP-022

Chemicals

Application notes

Vlažnost loptica sapuna

The CHINO IM series is an on-line multi wavelength analyzer utilizing infrared absorption technology to measure percent water in soap pellets. The standard moisture range of the unit is 0.0% to 15.0% with a 0.3% resolution or 0.0% to 30.0% with a 0.8% resolution.
Moisture content of soap pellets differs depending on desired characteristics of the soap bar. On-line moisture measurement at the exit of the Spray Dryer/Pelletizer provides immediate feedback on moisture levels enabling more rapid optimization of the process upon start-up, on-going cost savings from more efficient usage of the dryer, and consistent high quality product.
Signal processing capabilities are built into the compact designed detector unit for easy installation and operation. A maximum of 99 calibration curves can be stored into the detector memory for numerous measurement applications.
The detector can be used by itself or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Moisture in Soap Pellets APP-022

Products / Location	Parameter	Range
Soap (exit of pelletizer)	Moisture	5 to 15%
Soap powder (before pelletized)	Moisture	2 to 8%

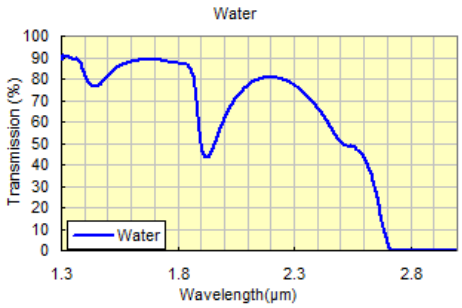
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

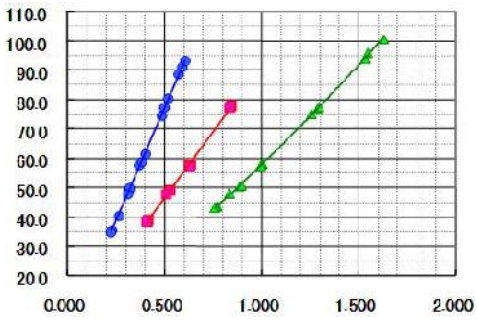
Moisture measurement is made at the exit of the pelletizer (extruder), the 4-20 mA output can be used to control steam pressure in the heat exchanger which influences the moisture content of the pellets. The gauge is installed at an angle of 20° to the horizontal in order to minimize specular reflection. If the exit chute is enclosed, the product can be viewed through either a viewing window or an insertion probe.

Absorption characteristic



Above chart indicated coalition between infrared spectrum and substance transmission.

Calibration curve



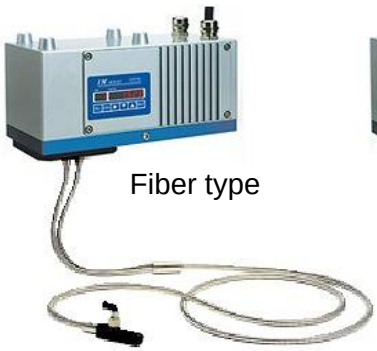
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-010

Chemical

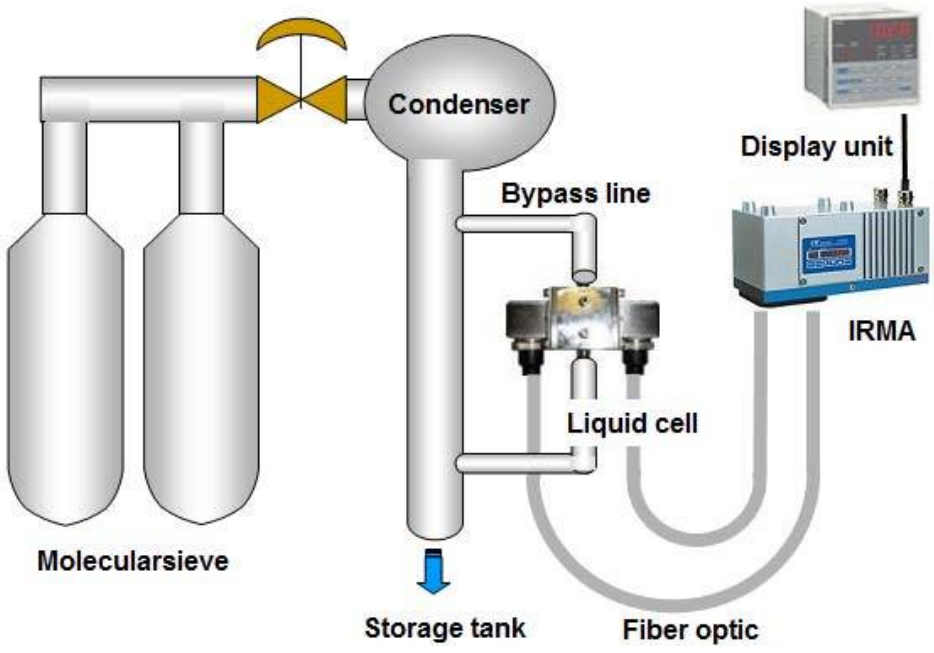
Application notes

Vlažnost u 100 procentnom etanolu

The CHINO IM series is an on-line multi wavelength liquid analyzer utilizing infrared absorption technology to measure percent water in 200 Proof Ethanol. The standard moisture range of the unit is 0.00% to 2.00% with a 0.01% resolution. Signal processing capabilities are built into the compact designed detector unit for easy installation and operation.

The System is provided with a NIR measuring Liquid Flow Cell connected to a pair of 20 meters (65 feet) fiber optic cables. Since the fibers contain no metal or electrically conductive material, the measuring Liquid Flow Cell is electrically isolated from the sensor processing electronics. This galvanic isolation long fibers is sufficient to move the processing unit out of the Hazardous rated area.

The detector can be used by itself or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Moisture in 200 proof ethanol APP-010

Products / Location	Parameter	Range
Ethanol	Moisture	190 to 200 prrof
Ethanol	Moisture	198 to 200 proof

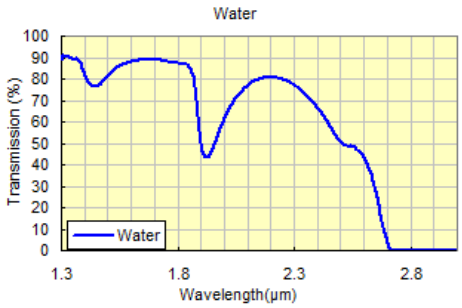
Recommended model / Item

* Transmission fiber type moisture unit
  Model : IRMA2100S Qty : 1
* Fiber optic cable (20m)
  Model : IR-HNL20 Qty : 2
* Measuring liquid cell
  Model : IR-WCC Qty : 1

Installation

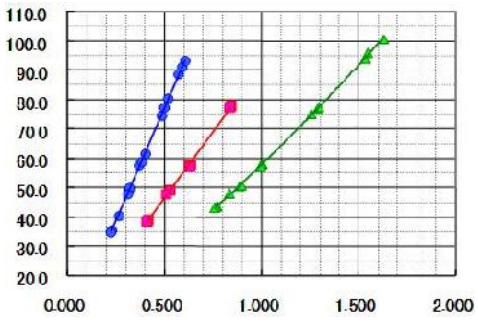
Typical installation in an ethanol plant is to have a bypass line going through Liquid Flow Cell between Condenser and the product storage. With the long fiber optic cables, it is possible to install the unit itself away from the location of Liquid Flow Cell where it is hazardous rated area in most of cases.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



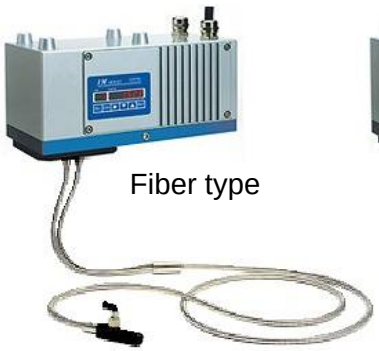
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-011

Chemical

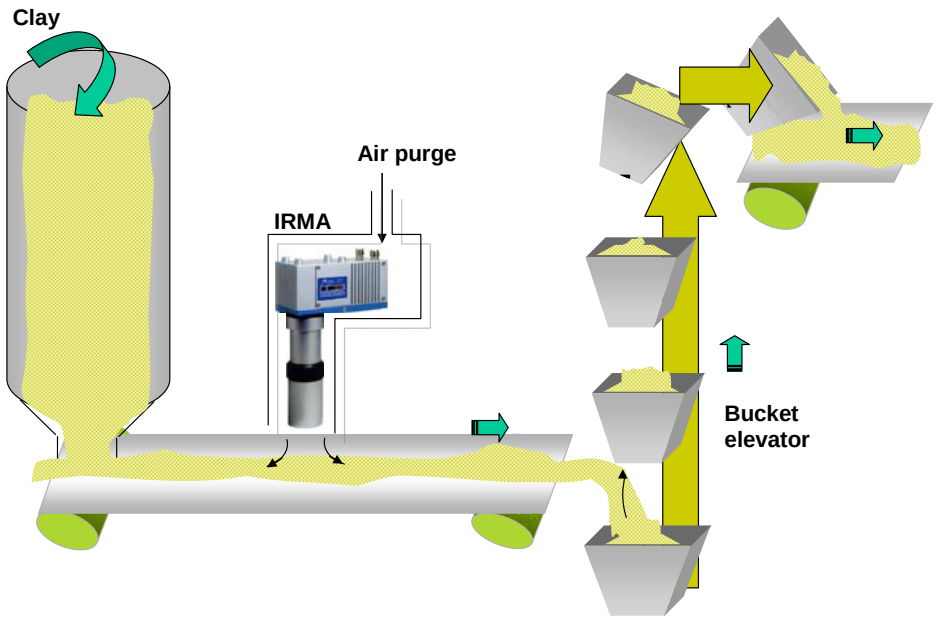




Application notes

Vlažnost u cement sirovoj glini

The CHINO IM series is an on-line multi wavelength analyzer utilizing infrared absorption technology to measure percent water in clay. The standard moisture range of the unit is 0.0% to 15.0% with a 0.3% resolution or 0.0% to 30.0% with a 0.8% resolution. Moisture control on cement clay plays an important role in order to determine high quality in its final form.
Controlling moisture may also be necessary to prevent the clay from sticking to conveyers or hopper, eliminating frequent process break and clean up.
Signal processing capabilities are built into the compact designed detector unit for easy installation and operation. A maximum of 99 calibration curves can be stored into the detector memory for numerous measurement applications.
The detector can be used by itself or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Moisture in cement raw clay APP-011

Products / Location	Parameter	Range
Clay	Moisture	5 to 15%
Clay	Moisture	5 to 30%

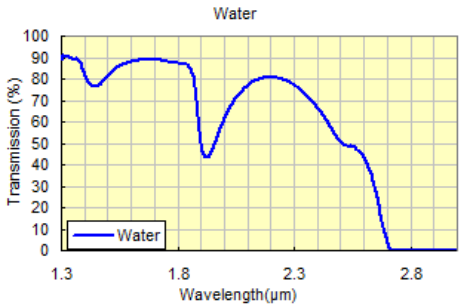
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Checking plate
  Model : IR-WEB Qty : 1

Installation

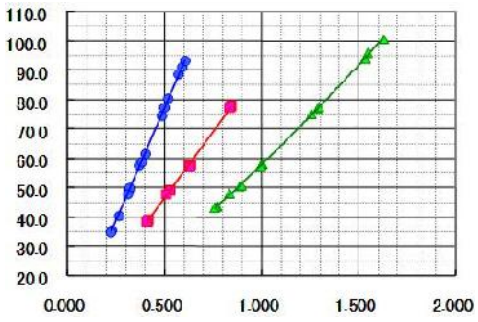
Typical installation is over a conveyer with air purged protection box in order to prevent dust from clogging the measuring light path. In some cases, the level of the product on a conveyer may be not leveled evenly. It is recommended to use a leveling board prior to the measuring point.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



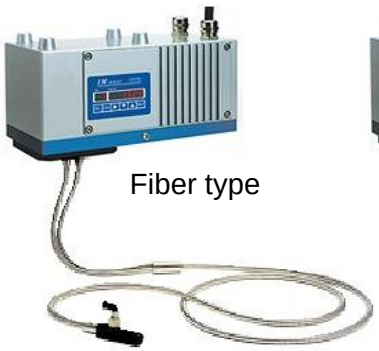
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

APP-047

Minerals





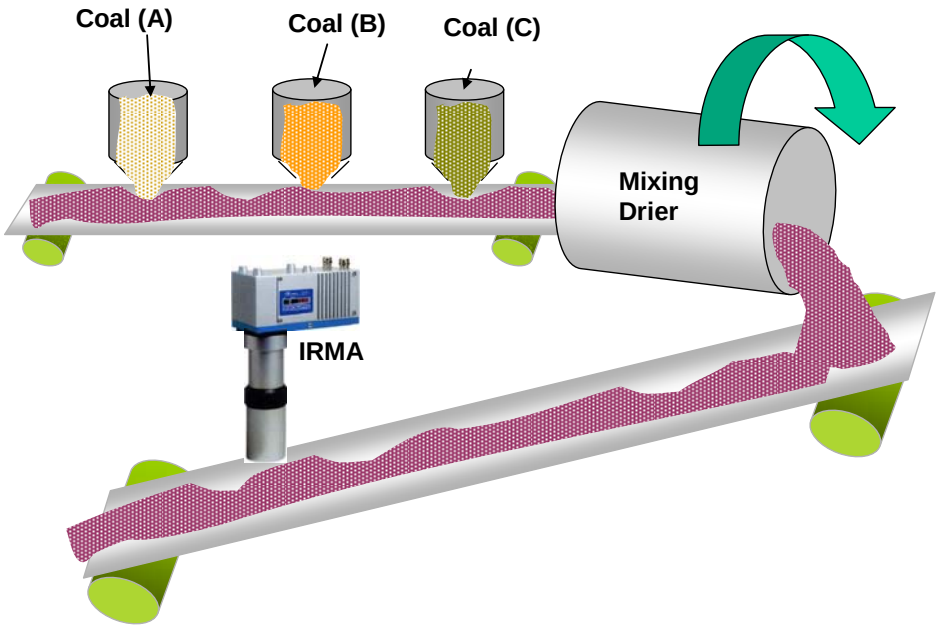
Application notes

Vlažnost u sirovom materijalu za primene sinterovanja

The CHINO IM series is an on-line multi wavelength analyzer utilizing infrared absorption technology to measure percent water in raw material such as clay, iron ore, lime stone or coal.
The standard moisture range of the unit is 0.0% to 15.0% with a 0.3% resolution or 0.0% to 30.0% with a 0.8% resolution. Such raw materials may be stored in an open atmosphere condition. Therefore water content in this raw material varies depending on weather conditions (Rain or Dry season, etc.).

Signal processing capabilities are built into the compact designed detector unit for easy installation and operation. A maximum of 99 calibration curves can be stored into the detector memory for numerous measurement applications.

The detector can be used by itself or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Moisture in raw material for sintering APP-047

Products / Location	Parameter	Range
Sintered iron	Moisture	4 to 15%

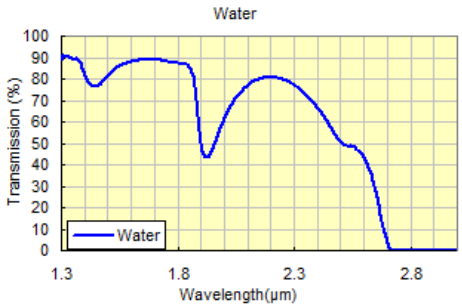
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

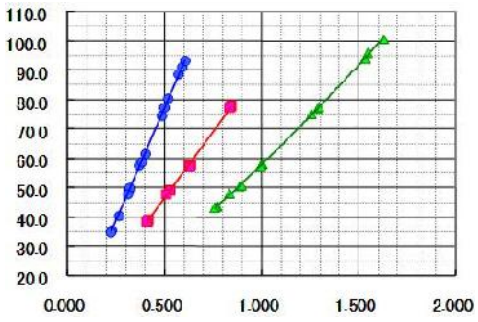
In order to obtain better mixing of those raw materials, water may need to be added, or before sintering the mixed raw material needs to be dried out down to certain moisture level. Installation can be done before mixing for monitoring proper water content for the best mixing, or the unit can be installed after the mixing to get ready for sintering.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



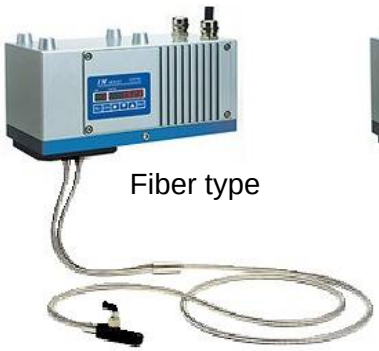
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

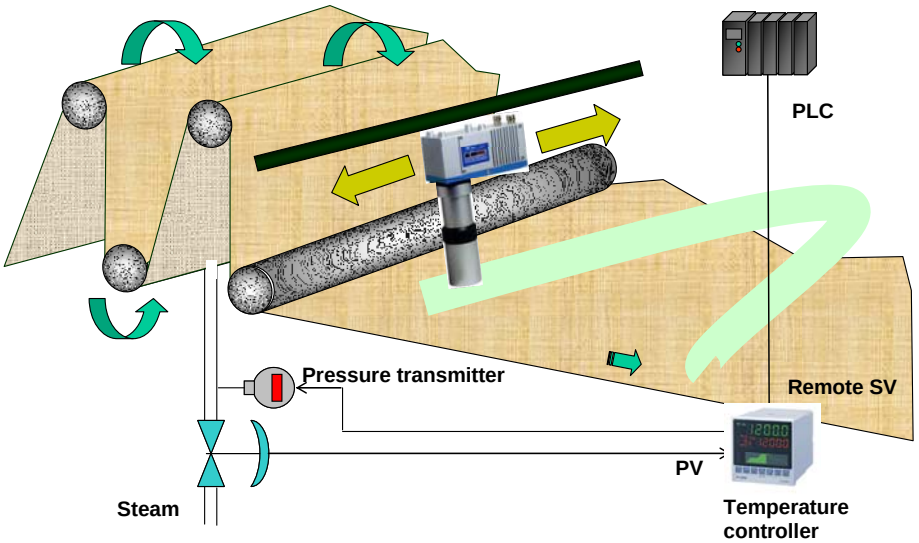
APP-063

Paper/Converting

Application notes

Vlažnost u papiru

The CHINO IM series is an on-line multi wavelength liquid analyzer utilizing infrared absorption technology to measure percent water in paper production. The standard moisture range of the unit is 2.0% to 12.0% with a 0.2% resolution or 0.0% to 30.0% with a 0.8% resolution.
Moisture values of paper in the paper making process and humidification process must be suppressed to be within several % H2O with the reference value for the purpose of attaining the uniform quality and energy-saving. After winding, the moisture value is normally controlled by a sample test. With CHINO IM series, it will be measured in on-line mode and the dryer temperature is controlled to set the moisture value to conform to its aimed specified value as increasing examples in recent years.
Signal processing capabilities are built into the compact designed detector unit for easy installation and operation. A maximum of 99 calibration curves can be stored into the detector memory for numerous measurement applications.
The detector can be used by itself or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Moisture in paper APP-063

Products / Location	Parameter	Range
Paper	Moisture	2 to 12%
Paper	Moisture	0 to 30%

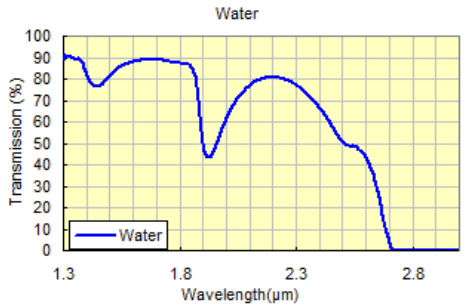
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

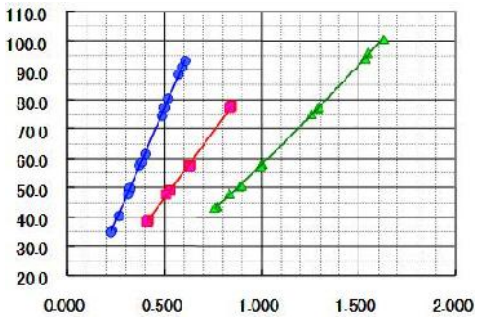
There are many points the moisture level needs to be monitored and controlled in order to create certain type of paper, such as after press, before initial dry or after several dryers. Some customers may need a traversing mechanism in order to have moisture profiling.

Absorption characteristic



Above chart indicated coalition between infrared spectrum and substance transmission.

Calibration curve



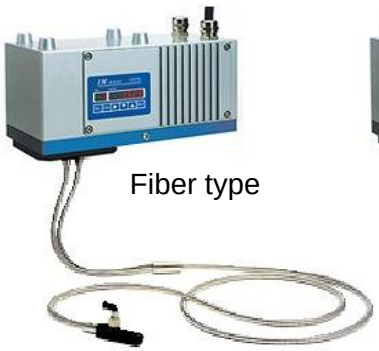
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit

IM SERIES

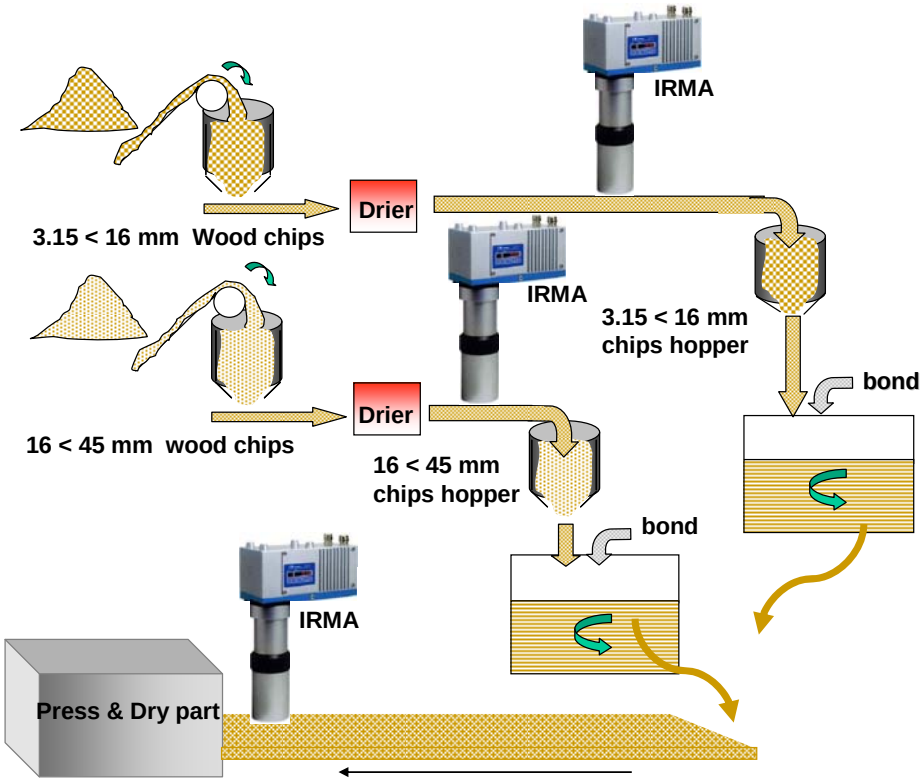
APP-083

Wood Products

Application notes

Vlažnost piljevine

The CHINO IM series is an on-line multi wavelength liquid analyzer utilizing infrared absorption technology to measure percent water in particle board chips. The standard moisture range of the unit is 2.0% to 12.0% with a 0.2% resolution or 0.0% to 30.0% with a 0.8% resolution.
Fine and coarse chips are mixed with a bonding agent in a stirring tank, respectively, and a particle board is prepared by flowing them into a mold alternately. Since the bonding condition differs according to the moisture being contained in chips, uneven moisture causes uneven bonding strength. Therefore moisture control becomes important.
Signal processing capabilities are built into the compact designed detector unit for easy installation and operation. A maximum of 99 calibration curves can be stored into the detector memory for numerous measurement applications.
The detector can be used by itself or connected to a PC or DCS plant control system. Both analog (4 to 20mA DC) and digital (RS-485 or LAN Ethernet) outputs are provided. A remote setting display unit, which connects up to 9 detector units, can be used to set various detector functions and also displays measured values.



Moisture in particle board chips APP-083

Products / Location	Parameter	Range
Wood chips (3.15 to 19mm)	Moisture	7 to 15%
Wood chips (16 to 45 mm)	Moisture	7 to 15%

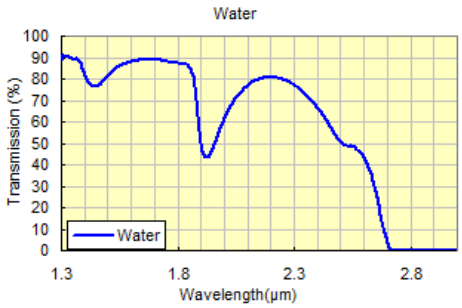
Recommended model / Item

* General moisture unit
  Model : IRMA1100S Qty : 1
* Air purge hood
  Model : IR-WEA Qty : 1
* Calibration checker plate
  Model : IR-WEB Qty : 1

Installation

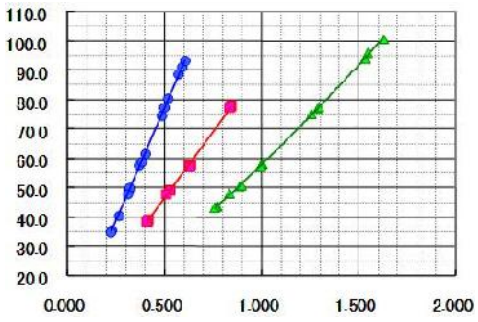
Installation can be made at the locations before each chips mixture is made in order to maintain the best mixture condition, or after molding and before press/dry or after press dry to monitor moisture on the final product.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



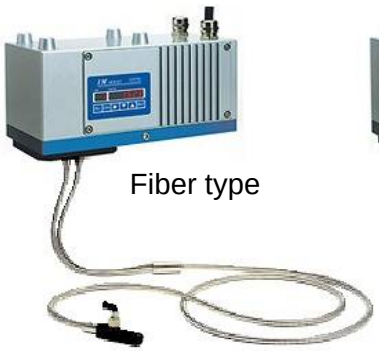
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).

Mirror type



Fiber type

Liquid cell type

Setting & Display unit